



NOAA Fleet Update

FEBRUARY 2015

The following update provides the status of NOAA's fleet of ships and aircraft, which play a critical role in the collection of oceanographic, atmospheric, hydrographic, and fisheries data. NOAA's current fleet of 16 ships – the largest civilian research and survey fleet in the world – and nine aircraft, are operated, managed, and maintained by NOAA's Office of Marine and Aviation Operations ([OMAO](#)). OMAO includes civilians, mariners, and officers of the United States NOAA Commissioned Officer Corps ([NOAA Corps](#)), one of the nation's seven Uniformed Services.



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Office of Marine and Aviation Operations (OMAO) and the NOAA Commissioned Officer Corps – In the News –



Below is a sampling of clips and web links to recent news items related to OMAO and the NOAA Corps.

[Ken Kaye's Storm Center: NOAA ship capable of finding Amelia Earhart's plane, Flight 19](#)

-Sun-Sentinel

It does not look all that impressive at first blush, but best believe **NOAA Ship *Okeanos Explorer*** is a very cool ship. Called "America's Ship for Ocean Exploration," it is the only federally funded U.S. vessel assigned to systematically explore the largely unknown ocean in the name of science and discovery. Equipped with a multi-beam sonar system and unmanned robots, it can examine objects almost four miles below the surface. It even has a satellite link, allowing marine aficionados to follow its adventures on the internet. Two of its main missions this year: Investigate the Caribbean Sea, focusing on deepwater habitats and trenches, and examine the Pacific around the Hawaiian Islands. "It's always exploring," said Fred Gorell, spokesman for NOAA's Office of Ocean Exploration and Research. *Okeanos Explorer* is so technologically advanced that it could potentially find Amelia Earhart's Lockheed 10E Electra or Flight 19 - the five Navy TBM Avengers that took off from Fort Lauderdale in 1945 and vanished - he said. Both of those are suspected to be resting on (or below) the ocean floor, the Electra in the South Pacific, Flight 19 in the Atlantic off the Central Florida coast. The *Okeanos Explorer* would first need a scientific purpose for undertaking such search missions - and the search area would have to be very specific, Gorell added. "It is an awfully small ship and it is an awfully big ocean," he said.

[Sky me a river: Scientists say flood threat linked to atmospheric rivers](#)

-Washington Post

During a powerful storm, a ship bounced up and down on 20-foot waves in the black of night, "out in the middle of nowhere," said Chris Fairall, 750 miles off the coast of San Francisco in the Pacific Ocean. "A lot of people said they didn't sleep well at breakfast the next morning." It was the first of several storms for the 30-member crew of the **NOAA Ship *Ronald H. Brown***, the largest ship in the fleet of the National Oceanic and Atmospheric Administration. Why were 18 scientists and crew, including six from Howard University, braving rolling waters on a ship in the vast ocean between California and Hawaii? They were searching for rivers in the sky, trying to unlock the mystery of how they channel water from the tropics and dump it in various types of precipitation on California's lakes and mountains, Fairall said in an interview Friday, talking on a satellite telephone. Atmospheric rivers, as they are called, carry enormous amounts of waters that have caused damaging floods, but predicting where they will strike can help officials avoid harm and possibly manipulate the water for more beneficial usage, particularly in a region suffering drought, such as California today. NOAA scientists have studied atmospheric rivers for more than a decade, but they had never succeeded in convincing the agency to include the Cadillac of its ship fleet to participate, said Fairall, a NOAA physicist.... "These rivers are an important global phenomenon," said Allen B. White, a NOAA meteorologist who waits for a chance every day at an airport in Sacramento

to hop in an agency jet and fly in and above the sky rivers at 45,000 feet to drop various electronic devices and other gadgets to study them. “It’s scary,” he said. “All you see out the window is fog, rain pelting the windows and it’s very bumpy...”

Molly McCrea, KPIX, SF CBS affiliate, [Team of scientists sailing into massive Pacific storm to study 'atmospheric river' effects on California drought](#)

Darrell Smith, Sacramento Bee, [Atmospheric Rivers poised to soak Sacramento](#)

Amy Quinton, Capital Public Radio, [Research of atmospheric rivers key to understanding California's water supply](#)

David Bienick, KCRA, [Scientists dissect approaching atmospheric river](#)

Lonnie Wong and Darren Peck, Fox 40, [NOAA goes airborne to study storm](#)

Deborah Sullivan Brennan, San Diego Union Tribune, [Scientists fly into storms in search of rain](#)

Amy Quinton, Capital Public Radio, [Research of atmospheric rivers key to understanding California's water supply](#)

Bob Henson, Weather Underground, [Atmospheric river heads to California as a massive field study gears up](#)

Special interest: Aviation International News, [Rockwell Collins, NOAA Expand Airborne Weather Observation Research](#)

NOAA Corps - Basic Officer Training Class (BOTC) 125

BOTC 125 is off to a roaring start despite the minus zero wind chill factors at the USCG Academy (USCGA) in New London, Connecticut, in early January. BOTC 125 reported to the USCGA on January 8, 2015, and completed their first week of the indoctrination phase; including 0500 wake ups from staff officers and a physically, emotionally, mentally challenging, and rigorous schedule. During their first week of training, they conducted their first drill competition with the 52 members of the current Coast Guard class. BOTC 125 officer candidates are learning the value of time management, situational awareness, and attention to detail with constant attention from staff officers in the barracks.

On January 16, 2015, the 14 members of BOTC 125 toured the USCGA museum as part of their NOAA history class. The NOAA history class began with Captain Albert E. Theberge (NOAA Corps, ret.) conducting a webinar on NOAA Corps' predecessor's involvement in the Civil War and World War II. The day ended with some hands-on history at the USCGA museum directed by museum curator, Ms. Jennifer Gaudio, and intern, Mr. Matt Sanders. Items shown were Hopley Yeaton's musket, a narwhal tusk, a life jacket from WWII, engraved ivory pieces, and an old temperature, conductivity, and salinity wheel. The importance of the partnership between NOAA and USCG, and our shared historical legacy, were enhanced by the experience. BOTC 125 commenced their academic training under Maritime Simulation Institute (MSI) instructor, Captain Rick Comeau. MSI is a state-of-the-art marine simulation center located in Middletown, RI.



NOAA BOTC 125 holding historical maritime artifacts during a visit to the USCGA Museum (New London, CT).

[Photo: LTJG Proie, NOAA]



OMAO's Ships and Centers



OMAO's Ship Tracker (screen shot below) shows information about the location - present and past - of our fleet of research and survey ships. <http://shiptracker.noaa.gov>



OMAO's ships and related Marine Centers are listed below based on the geographical location of the vessels' homeports starting in the Northeast and ending in the Pacific.

New Castle, NH

NOAA Ship *Ferdinand R. Hassler*

Commanding Officer: CDR Marc Moser

Primary Mission Category: Hydrographic Surveys

DEPART: New Castle, NH

ARRIVE: New Castle, NH

Project: Hydrographic Survey Operations in the Gulf of Maine

Objectives: To support safe navigation through the acquisition and processing of hydrographic survey data for updating nautical charts and by the identification and dissemination of dangers to navigation as identified during the course of survey operations.



The [Blizzard of 2015](#) hit New England hard. [NOAA Ship *Ferdinand Hassler*](#) was safely in port in New Castle, NH, but the crew still had to break out their snow shoveling gear. It is important to remove snow and ice from the ship as soon as possible, as it can affect stability.

[Photo: LT Morgan, NOAA]

Woods Hole, MA (currently docks in Newport, RI)

NOAA Ship *Henry B. Bigelow*

Commanding Officer: CDR G. Mark Miller

Primary Mission Category: Fisheries Research

Ship Status: Alongside Newport, RI, for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

Davisville, RI

NOAA Ship *Okeanos Explorer*

Commanding Officer: CDR Mark Wetzler

Primary Mission Category: Oceanographic Exploration and Research

DEPART: Davisville, RI

ARRIVE: San Juan, PR

Project: Patch test and ship shakedown / Caribbean Exploration (Mapping)

Objectives: Conduct patch test to calibrate hydrographic survey equipment and sea trials to measure the vessel's performance and general seaworthiness after repair period. After calibration, conduct Caribbean Exploration Mapping project.

1. Collect deep water multibeam bathymetry sonar data.
2. Collect sonar data acquisition with EK60 single beam sonar and Knudsen sub-bottom profiler.
3. Conduct Expendable Bathymetric Thermograph (XBT) operations.
4. Deploy National Ocean Service gliders.
5. Deploy Free Vehicles along Puerto Rican trench.
6. Train new personnel in all data collection and processing procedures.
7. Test new or modified mission hardware and software.
8. Maintain telepresence.

Norfolk, VA

NOAA Ship *Thomas Jefferson*

Commanding Officer: CAPT Shepard Smith

Primary Mission Category: Hydrographic Surveys

Ship Status: Alongside Marine Operations Center – Atlantic, Norfolk, VA, for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

OMAO'S MARINE OPERATIONS CENTER – ATLANTIC (MOC-A)

CAPT Anne Lynch, Commanding Officer MOC-A

MOC-A serves as a homeport for one NOAA ship, and manages the day-to-day operations and provides administrative, engineering, maintenance, and logistical support for the research and survey ships in NOAA's Atlantic fleet. Each year these ships conduct dozens of missions to assess fish and marine mammal stocks, conduct coral reef research, collect seafloor data to update nautical charts, and explore the ocean.

Charleston, SC

NOAA Ship *Nancy Foster*

Commanding Officer: LCDR Jeffrey Shoup

Primary Mission Category: Oceanographic Research, Environmental Assessment

Ship Status: In drydock at GMD Shipyard in Brooklyn, NY, for installation of an EM710 multibeam sonar.

NOAA Ship *Ronald H. Brown*

Commanding Officer: CAPT Robert Kamphaus

Primary Mission Category: Oceanographic Research, Environmental Assessment

DEPART: Honolulu, HI

ARRIVE: San Diego, CA

DEPART: San Diego, CA

ARRIVE: Papeete, Tahiti

Project 1: CALWATER 2 Study

Objectives: Characterize air-sea interaction characteristics of the marine boundary layers in both background and storm conditions. This will include: characterizing air-sea fluxes and aerosol production in atmospheric rivers (ARs), characterizing oceanic and atmospheric mixed layer response to ARs, and characterizing the size-resolved properties of boundary layer aerosols in the open ocean versus the coastal regime.

Project 2: Tropical Atmosphere Ocean (TAO) Buoy Array Maintenance (125W / 140W)

Objectives: Maintenance of the TAO moored ocean buoy array along the 125°W and 140°W meridians. The TAO buoy array is critical to providing real-time data for improved detection, understanding and prediction of El Nino and La Nina events.



NOAA Ship *Ronald H. Brown* pulling into San Francisco, CA this month, after taking part in the CALWATER2 project alongside [the NOAA Hurricane Hunters](#), off the Pacific coast.

[Photo: Eric Thompson, NOAA]

Pascagoula, MS

NOAA Ship *Oregon II*

Commanding Officer: Master Dave Nelson

Primary Mission Category: Fisheries Research

Ship Status: In drydock at VT Halter Marine in Pascagoula, MS, for a scheduled repair period.

NOAA Ship *Gordon Gunter*

Commanding Officer: Master Donn Pratt

Primary Mission Category: Fisheries Research

DEPART: Pascagoula, MS

ARRIVE: Pascagoula, MS

Project: Southeast Area Monitoring and Assessment Program (SEAMAP) Winter Ichthyoplankton

Objectives:

1. Assess the occurrence, abundance and geographical distribution of the early life stages of winter spawning fishes (especially groupers and tilefishes) from mid continental shelf to deep Gulf of Mexico waters by sampling at selected SEAMAP stations.
2. Describe the pelagic habitat of fish larvae through measurements of various physical and biological parameters.
3. Measure the vertical distribution of fish larvae by sampling at discrete depths in the water column at selected locations along the SEAMAP plankton survey grid.
4. Map the distribution of fish eggs and invertebrate zooplankton along the cruise track using a Continuous Underway Fish Egg Sampler (CUFES).
5. Collect detailed observations of net-caught jellyfish and ctenophores.

NOAA Ship *Pisces*

Commanding Officer: CAPT Michael Hopkins

Primary Mission Category: Fisheries Research

Ship Status: Alongside Pascagoula, MS, for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

San Diego, CA

NOAA Ship *Reuben Lasker*

Commanding Officer: LCDR John Crofts

Primary Mission Category: Fisheries Research

Ship Status: The ship is alongside in San Diego, CA, due to voltage and harmonic issues within the propulsion motors and will remain alongside as solutions are developed.

Newport, OR

NOAA Ship *Rainier*

Commanding Officer: CDR E.J. Van Den Ameele

Primary Mission Category: Hydrographic Surveys

Ship Status: The ship is alongside Marine Operations Center – Pacific, Newport, OR, for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

NOAA Ship *Bell M. Shimada*

Commanding Officer: CDR Brian Parker

Primary Mission Category: Fisheries Research

DEPART: Newport, OR

ARRIVE: Newport, OR

DEPART: Newport, OR

ARRIVE: Newport, OR

Project 1: Northern California Current Ecosystem Survey

Objectives: Make hydrographic measurements such as Conductivity, Temperature, and Depth (CTD), collect water samples for chemical analyses with a Niskin bottle rosette, and collect zooplankton samples with towed plankton nets at an array of stations along transect lines extending across the Oregon, Washington, and northern California coast.

Project 2: Pacific *Orcinus* Distribution Survey 2015

Objectives: Conduct acoustic and visual surveys of marine mammals and seabirds along the Washington, Oregon, California, and Canadian coasts in order to determine Critical Habitat in the coastal portion of the range of Southern Resident killer whales. The collection of predation, fecal, and biopsy samples will be of significant additional value. Secondary objectives include locating and documenting other cetacean species, in particular the collection of photographs and audio recordings of other killer whale pods, as well as sea bird counts and oceanographic data.

OMAO'S MARINE OPERATIONS

Mr. Troy Frost, (Acting) Director of Marine Operations

OMAO's Marine Operations oversees operations of the three regional Centers, including the Marine Operations Center-Pacific, Marine Operations Center-Atlantic, and Marine Operations Center-Pacific Islands.

OMAO'S MARINE OPERATIONS CENTER – PACIFIC (MOC-P)

CAPT Douglas Baird, Commanding Officer MOC-P

MOC-P serves as a homeport for two NOAA ships, and manages the day-to-day operations and provides administrative, engineering, maintenance, and logistical support for the research and survey ships in NOAA's Pacific fleet. Each year these ships conduct dozens of missions to assess fish and marine mammal stocks, conduct coral reef research, collect seafloor data to update nautical charts, and explore the ocean.



View of Newport, OR with the NOAA MOC-P in the center - Jan 2015.

[Photo: ENS Manougian, NOAA]

Ketchikan, AK (currently docks in Newport, OR)

NOAA Ship *Fairweather*

Commanding Officer: CDR David Zezula

Primary Mission Category: Hydrographic Surveys

Ship Status: In drydock at the Bay Ship & Yacht Shipyard in Alameda, CA, for a scheduled repair period, followed by sonar acceptance trials and transit to Seattle, WA.

Kodiak, AK

NOAA Ship *Oscar Dyson*

Commanding Officer: CDR Arthur "Jesse" Stark

Primary Mission Category: Fisheries Research

DEPART: Kodiak, AK

ARRIVE: Kodiak, AK

DEPART: Kodiak, AK

ARRIVE: Kodiak, AK

Project 1: CO2 Surface and Fisheries Oceanography Coordinated Investigations Subsurface Mooring Recover/Deploy

Objectives: In support of NOAA's Ocean Acidification Program, NOAA will recover and deploy two surface instrumentation buoys to:

1. Characterize ocean acidification (OA) conditions on the U.S. in Southeast Alaska and northern Gulf of Alaska.

2. Conduct inter-calibration measurements near the OA observing assets in the study area, allowing inter-calibration of these autonomous assets with high quality, ship-based measurements.
3. Provide calibration data needed to develop predictive models for aragonite saturation state, pH, and other important OA indicators in the California Current System, based on widely measured parameters such as salinity, temperature, and oxygen concentration.
4. Provide quantitative assessment of phytoplankton, zooplankton, and harmful algal bloom activity in conjunction with OA measurements.
5. Provide scientific information on OA conditions and trends for resource management and decision support.

Project 2: Acoustic Trawl Survey of the Shumagin Islands, Sanak Trough, Pavlov Bay, Morzhovoi Bay, Kenai Peninsula Bays, and Prince William Sound (PWS).

Objectives:

1. Collect acoustic trawl data necessary to determine the distribution, biomass, and biological composition of walleye Pollock.
2. Collect target strength data using hull-mounted transducers for use in scaling acoustic data to estimates of absolute abundance.
3. Calibrate the EK60 acoustic and three autonomous echosounder systems using standard sphere calibration techniques.
4. Collect physical oceanographic data (temperature and salinity profiles) at selected sites, and continuously collect sea surface temperature and salinity data.
5. Conduct trawl hauls to ground truth multi-frequency echo integration data collection.
6. Deploy moored echosounders at three locations in Shelikof Strait and conduct Conductivity, Temperature, and Depth (CTD) casts and mini-acoustic surveys and trawls in vicinity of deployments. The areas where the moored echosounders are deployed will also be sampled on the transit from the Shumagin Islands survey area to Kenai/PWS survey area.

Honolulu, HI

NOAA Ship *Hi'ialakai*

Commanding Officer: CDR Daniel Simon

Primary Mission Category: Oceanographic Research, Environmental Assessment

DEPART: Pearl Harbor, HI

ARRIVE: Pago Pago, AS

DEPART: Pago Pago, AS

ARRIVE: Pago Pago, AS

Project: American Samoa - Reef Assessment and Monitoring Program (RAMP)

Objectives:

1. Conduct ecosystem monitoring of the species composition, abundance, percent cover, size distribution, recruitment, and general health of the fishes, corals, other invertebrates, and algae of the shallow water (< 35 m) coral reef ecosystems of Johnston Atoll, the Phoenix Islands, the Territory of American Samoa, and the Line Islands.
2. Deploy, retrieve, and/or service an array of Subsurface Temperature Recorders, Sea Surface Temperature Buoys, Autonomous Reef Monitoring Structures, Calcification Accretion Units, Bioerosion Monitoring Units, Ecological Acoustic Recorders, moored Acoustic Doppler Current Profilers (ADCP), as well as anchored arrays consisting of a portable underwater collector, ADCP, a Conductivity, Temperature, Depth (CTD) recorder and a thermistor string to allow remote long-term

monitoring of oceanographic and environmental conditions affecting the coral reef ecosystems of Johnston Atoll, the Phoenix Islands, the Territory of American Samoa, and the Line Islands. This effort is in support of the Coral Reef Ecosystem Integrated Observing Systems (CREIOS).

3. Monitor near-shore physical and ecological factors associated with ocean acidification and general water quality, including analysis of seawater for nutrients, chlorophyll concentration, salinity, temperature, dissolved oxygen, transmissivity, total alkalinity, and dissolved inorganic carbon. These parameters will be measured via the collection of water in Niskin bottles CTD casts. Shallow-water CTDs will be conducted from small boats to a depth of ~30 m.
4. Collect shallow water coral cores to examine calcification/growth rates in recent decades and assess potential early impacts of ocean acidification. Coring operations will be conducted opportunistically (as a scientific dive).
5. Shipboard ADCP surveys around reef ecosystems to examine physical and biological linkages supporting and maintaining the island ecosystems.
6. Collect oceanographic data utilizing ship-based measurement systems ADCP, ThermoSalinoGraph (TSG), and the Scientific Computer System (SCS) during all transits for the duration of the project.
7. Conduct investigations of marine microbial communities, including the collection of specimens via water sampling and benthic grab samples.
8. Determine the existence of threats to the health of these coral reef resources from anthropogenic sources, including marine debris.

NOAA Ship *Oscar Elton Sette*

Commanding Officer: CDR Stephanie Koes

Primary Mission Category: Fisheries Research

Ship Status: Alongside Marine Operations Center – Pacific Islands, Pearl Harbor, HI, for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.



NOAA - Coral Reef Ecosystem Division (CRED) [video](#) of the CRED Marine Debris Team standing on their pile of 51 metric tons of Marine Debris on the fantail of the NOAA Ship *Oscar Elton Sette* in October 2014.

[Photo: NOAA]

OMAO'S MARINE OPERATIONS CENTER – PACIFIC ISLANDS (MOC-PI)

CAPT Douglas Baird, (Acting) Commanding Officer MOC-PI

MOC-PI serves as a homeport for two NOAA ships, and manages the day-to-day operations and provides administrative, engineering, maintenance, and logistical support for the ships in NOAA's Pacific Islands' fleet.



OMAO's Aircraft



Tampa, Florida

OMAO'S AIRCRAFT OPERATIONS CENTER (AOC)

CAPT Harris Halverson, Commanding Officer AOC

The AOC, located at MacDill Air Force Base, serves as the main base for OMAO's fleet of nine aircraft and provides capable, mission-ready aircraft and professional crews to the scientific community. Whether studying global climate change or acid rain, assessing marine mammal populations, surveying coastal erosion, investigating oil spills, flight checking aeronautical charts, or improving hurricane prediction models, the AOC flight crews continue to operate in some of the world's most demanding flight regimes.

WP-3D (N42RF) – “Hurricane Hunter”

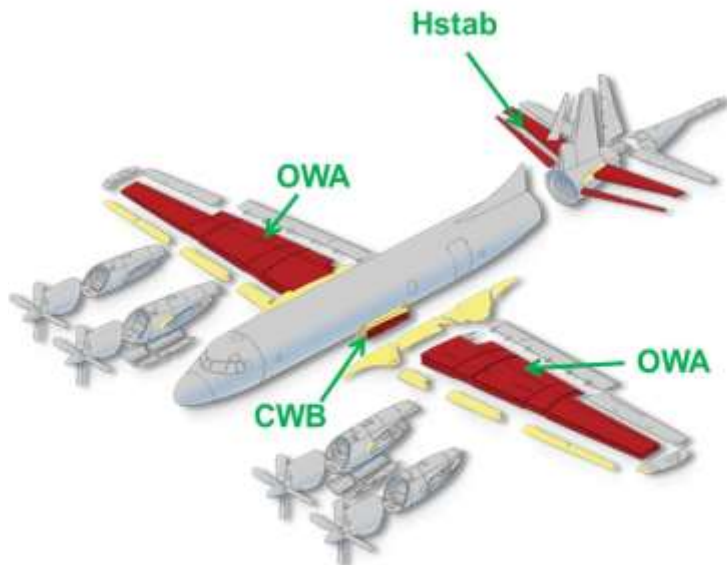
Aircraft Commander:	LCDR Scott Price
Temporary Base:	Halifax, Nova Scotia
Current Mission:	Ocean Winds Project

Aircraft will conduct the Ocean Winds Project for NESDIS over the North Atlantic Ocean. Microwave sensors flown aboard the P-3 aircraft in limiting environmental conditions (high winds and precipitation) will improve our understanding of measurements from existing satellite sensors such as ASCAT and the Oceansat2 scatterometers, and improve the design of future satellite sensors. This will result in better use of these data by weather and ocean models and human forecasters in their decision making process. This knowledge will also greatly aid in product improvements and planning for future satellite sensors such as DFS and ASCAT follow-on.

Re-winging of N42RF is scheduled to commence in March 2015 and finish in May 2016.

Re-wing Kit Consists of:

- Outer Wing Assembly (OWA)
- Center Wing Box (CWB)
- Horizontal Stabilizer (Hstab)
- Installation



Jet Prop Commander (N45RF)

Aircraft Commander:

LCDR Patrick Didier and LTJG Kyle Salling

Current Mission:

Various locations for Snow Survey / Soil Moisture Surveys

Aircraft will conduct Snow Survey operations for the National Operational Hydrologic Remote Sensing Center. The project utilizes an Airborne Gamma Radiation detector to make airborne Snow Water Equivalent and soil moisture measurements. Airborne Snow Water Equivalent measurements are used by NWS Weather Forecast Offices and NWS River Forecast Centers when issuing river and flood forecasts, water supply forecasts, and spring flood outlooks.

Twin Otter (N46RF)

Aircraft Commander:

LT John Rossi and LTJG Kevin Doremus

Current Mission:

Various Locations for Snow Survey / Soil Moisture Surveys

Aircraft will also conduct Snow Survey and Soil Moisture operations for the National Operational Hydrologic Remote Sensing Center, as described above.



NOAA's Twin Otter Aircraft N46RF on the tarmac in Duluth, Minnesota before a snow survey, January 2015.

[Photo: ENS Bonner, NOAA]

Twin Otter (N48RF)

Aircraft Commander:

LCDR Jason Mansour and LCDR Nick Toth

Temporary Base:

Saint Simons Islands, GA

Current Mission:

Southeastern Right Whale Survey – Georgia coastal waters

Aircraft is conducting the Southeastern Right Whale survey out of Saint Simons Is., GA. NOAA Fisheries Service Southeast Regional Office conducts these multi-aircraft surveys annually, from South Carolina to Florida, in an effort to determine calf production, right whale distribution relative to habitat variables, and to reduce ship collisions with right whales. Surveys are flown under contract or grants to the Florida Fish and Wildlife Conservation Commission, Georgia Department of Natural Resources, New England Aquarium, and the Wildlife Trust.

Twin Otter (N56RF)

Aircraft Commander: LTJG Kevin Doremus
Current Mission: Various Locations for Southeast Atlantic Marine Assessment Program for Protected Species. Atlantic waters off the U.S. coast.

Aircraft is conducting the Southeast Atlantic Marine Assessment Program for Protected Species (AMAPPS). This multi-year survey will serve multiple objectives with respect to marine mammal conservation: 1) provide distribution and abundance of all species of cetaceans, seals, and sea turtles for the spring which will be used to develop spatially and temporally-specific density maps that will be available to other agencies and the public; 2) provide photo-identification records on Right whales, and 3) provide sightings of dead whales. The AMAPPS survey is a cooperative effort between NMFS's Northeast and Southeast Fisheries Science Centers.

Twin Otter (N57RF)

Temporary Base: Calgary, Alberta (Canada)
Current Mission: Aircraft is undergoing a scheduled corrosion inspection.

Gulfstream IV (N49RF)

Aircraft Commander: LT Ronald Moyers
Temporary Base: Sacramento, CA
Current Mission: CALWATER 2 Mission

Aircraft is conducting CALWATER 2 mission to measure aerosol (solid or liquid air particles suspended in air) plumes and their interaction with atmospheric rivers off, near and on coastal and inland environments. Atmospheric rivers are a direct source of precipitation to the west coast of the United States. This aircraft will be conducting the CALWATER 2 project, along with the NOAA WP-3D, N43RF. The G-IV will be obtaining high altitude data while the WP-3D will be concentrating on mid to low altitudes.

A better understanding of Atmospheric Rivers (ARs) and Aerosols is needed to reduce uncertainties in weather predictions and climate projections of extreme precipitation and its effects, including the provision of beneficial water supply. In the [CALWATER 2 white paper](#), science gaps are identified associated with (1) the evolution and structure of ARs, (2) the prediction of aerosol burdens and properties during intercontinental transport from remote source regions to the U.S. West Coast, and (3) aerosol interactions with ARs and the impact on precipitation, including locally generated aerosol effects on orographic precipitation along the U.S. West Coast. A set of science investigations are proposed to fill these gaps with a targeted set of aircraft and ship-based measurements and associated evaluation of data over regions offshore of California and in the central and eastern Pacific for an intensive observing period.

Operational partners include NASA, National Science Foundation, Department of Energy and UC San Diego. NOAA operational research platforms working on this project include: NOAA WP-3D and NOAA G-IV aircraft, as well as NOAA Ship *Ronald H. Brown*.



"Atmospheric Rivers" project is currently underway off the California coast. February 3, the local news media in San Francisco shot a great story on this important project: <http://sanfrancisco.cbslocal.com/2015/02/03>

[Photo: SANFRANCISCO.CBSLOCAL.COM]

WP-3D (N43RF)

Aircraft Commander:

CDR Mark Sweeney

Temporary Base:

Sacramento, CA

Current Mission:

Scheduled maintenance and upgrades/ CALWATER 2 Mission

Aircraft is conducting the CALWATER 2 Mission, described above, off the U.S. West Coast, collecting data on atmospheric conditions between Hawaii and California. The objectives of this project are improved understanding of atmospheric river structure, lifecycle, impact on US west coast due to precipitation and flooding, as well as improved forecast capability for Atmospheric River events. This aircraft is conducting the CALWATER 2 project, along with the NOAA G-IV, N49RF. The G-IV will be obtaining high altitude data while the WP-3D will be concentrating on mid to low altitudes.

King Air (N68RF)

Aircraft Commander:

CAPT Adam Dunbar and LT Rebecca Waddington

Current Mission:

Various Locations – Continuous Coastal Mapping

King Air is conducting Coastal Mapping mission flights in various locations. The Coastal Mapping work is an on-going mission, run by the Remote Sensing Division of the National Geodetic Survey (NGS), with the goal of providing a regularly-updated national shoreline for supporting marine navigation, defining territorial limits, and managing coastal resources. Stereo photogrammetry and LiDAR are used to produce a digital database for a national shoreline. The King Air will be conducting operations along the U.S. eastern seaboard and along the Gulf of Mexico.



Unmanned Systems Support



NASA Global Hawk

Location: Edwards Air Force Base (AFB), CA

One of NASA's Global Hawks is currently being instrumented for a multinational science campaign. The Coordinated Airborne Studies in the Tropics project, or CAST, will carry eight payloads (two from NOAA) operating out of Edwards AFB to the equatorial region for atmospheric profiling. Science flights will begin in late February and conclude in March of 2015. A NOAA Corps officer, LCDR Jonathan Neuhaus, will be participating as a pilot and project manager.

APH-22 Hexacopter

Location: Antarctica – Cape Shirreff, Livingston Island and Copacabana Field Camp, King George Island

Mission: Aerial Survey of Penguin Colonies and Fur Seals

The Southwest Fisheries Science Center has successfully used the APQ-16 and APH-22 in field seasons from 2010 to 2014, and continues this effort this year from Cape Shirreff Field Station in Antarctica. SWFSC also plans to expand the aerial survey work to include routine monitoring flights conducted at a second research site in Antarctica at the U.S. Antarctic Ecosystem Research program's seabird monitoring project at the Copacabana Field Camp in Admiralty Bay on King George Island. This season's efforts from Copacabana Field Camp will focus on collecting replicate counts of penguin chicks for Adélie, Gentoo, and Chinstrap penguins and establishing base line photo mosaics of colony locations and sizes in a rapidly changing colony of penguins. Integrated within these missions will be a set of controlled, decreasing-altitude flights to establish the affect, if any, that these flights have on wild animal populations. This season's efforts from Cape Shirreff will focus on collecting replicate counts of breeding pairs and chicks for Gentoo and Chinstrap penguins, Antarctic fur seal pup counts, and defining the relationship between mass of leopard seals and their size and shape as determined from vertical aerial photographs.

Puma

Location: Offshore Waters of Maui and Hawaii

Mission: Hawaiian Islands Humpback Whale National Marine Sanctuary Puma Project

This project is a demonstration and evaluation of the Puma Unmanned Aerial System (UAS) platform and payload to support Humpback Whale research and entanglement response efforts at the Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS). The Office of National Marine Sanctuaries plans on utilizing the Puma UAS for a variety of Sanctuary management and research requirements. The primary mission will be Living Marine Resource surveys, specifically humpback whale research. In addition, joint operations with the Puma and a Liquid Robotics Wave Glider Unmanned Surface Vehicle (USV) are planned to evaluate future potential for joint UAS and USV operations. The Puma will be evaluated for potential large whale entanglement emergency response. The Puma will be operated in coordination with the USV in a "tip and queue" scenario where the Puma will identify areas of interest and the USV will be directed to the designated location for surface analysis.



Douglas Krause, a research biologist with NMFS and UAS pilot, seen here piloting a hexacopter in Antarctica.

[Photo: McKenzie Mudge, NOAA/NMFS]



OMAO Partnerships



United States Senate Committee on Commerce, Science, and Transportation – Office of Ranking Member, Senator John Thune (R-SD)

Location: Washington, DC

Detail: LCDR Wendy Lewis, NOAA Commissioned Officer Corps

LCDR Lewis is currently on detail to the Committee and the office of Ranking Member Thune where she will be assisting on activities pertaining to oceans, atmosphere, and fisheries policy, as well as other matters within the Committee's jurisdiction

National Science Foundation

Location: Antarctica

Mission: LTJG Jesse Milton, NOAA Commissioned Officer Corps

Members of the [NOAA Commissioned Officer Corps](#) carry out NOAA's mission in remote locations across the globe. LTJG Milton is assigned to Antarctica where he serves as the Station Chief for NOAA's Atmospheric Research Observatory (ARO) at the Amundsen-Scott South Pole Station. The ARO at the Amundsen-Scott South Pole Station is a National Science Foundation facility used in support of scientific research related to atmospheric phenomena.

Department of Defense - U.S. Pacific Command (USPACOM)

Location: Honolulu, HI

Embedded Liaison: CAPT Barry Choy, NOAA Commissioned Officer Corps

The U.S. Pacific Command (USPACOM) area of responsibility encompasses approximately half the earth's surface and more than half of its population. The 36 nations that comprise the Asia-Pacific include: two of the three largest economies and nine of the ten smallest; the most populous nation; the largest democracy; the largest Muslim-majority nation; and the smallest republic in the world. The region is a vital driver of the global economy and includes the world's busiest international sea lanes and nine of the ten largest ports. By any meaningful measure, the Asia-Pacific is also the most militarized region in the world, with seven of the world's ten largest standing militaries and five of the world's declared nuclear nations. Under these circumstances, the strategic complexity facing the region is unique. CAPT Choy is linked closely with the activities within the region allowing for identification of opportunities and cooperation between USPACOM and NOAA, and better overall government function situational awareness in the region.

Department of Defense - U.S. Northern Command (USNORTHCOM)

Location: Boulder, CO

Embedded Liaison: CAPT Mark Moran, NOAA Commissioned Officer Corps

U.S. Northern Command (USNORTHCOM) partners to conduct homeland defense, civil support, and security cooperation to defend and secure the United States and its interests. NORTHCOM's area of responsibility includes air, land, and sea approaches and encompasses the continental United States, Alaska, Canada, Mexico, and the surrounding water out to approximately 500 nautical miles. It also includes the Gulf of Mexico, the Straits of Florida, and portions of the Caribbean region that include The Bahamas, Puerto Rico, and the U.S. Virgin Islands. CAPT Moran serves as the liaison for the NOAA Corps, helping to plan, organize, and execute homeland defense and civil support missions.

Department of Defense - U.S. Navy

Location: Washington, DC

Embedded Liaison: CDR Christiaan van Westendorp, NOAA Commissioned Officer Corps
CDR van Westendorp serves as NOAA liaison to the Oceanographer of the Navy and is an important interface between the U.S. Navy and other U.S. Federal Agencies, including NOAA. As NOAA Liaison, CDR van Westendorp serves as the Head of the Interagency Policy Branch of the International and Interagency Policy Division, Office of the Oceanographer of the Navy, located at the U.S. Naval Observatory. The mission of this Division is to coordinate and execute the Oceanographer of the Navy functions related to policy and programs involving international and/or interagency oceanography. Oceanography includes meteorology, oceanography, mapping, charting and geodesy, astronomy, and precise time and time interval.

Department of Defense - U.S. Navy

Location: Stennis Space Center, MS

Embedded Liaison: LT Jonathan French, NOAA Commissioned Officer Corps
Embedded in the Navy's Naval Oceanography Mine Warfare Center, LT French works side by side with Navy officers operating Unmanned Underwater Vehicles worldwide and is currently deployed to the Arabian Gulf. This collaboration will provide knowledge and experience that will keep NOAA on the cutting edge of this emerging technology as well as strengthen the partnership between NOAA and the Navy.

Department of Defense and NOAA's Office of Coast Survey

Location: Silver Spring, MD

Embedded Liaison: CDR Matthew Wingate, NOAA Commissioned Officer Corps
NOAA's National Ocean Service Office of Coast Survey (OCS) is the lead federal provider of nautical charts and hydrographic survey data of the U.S. Exclusive Economic Zone. Meeting this responsibility requires active cooperation and coordination with federal partners in the Departments of Defense and Homeland Security with which NOAA shares responsibility for U.S. navigational products and services. CDR Wingate tracks, coordinates, and adds value to existing activities involving OCS subject matter experts and partners, seeks and develops additional opportunities for collaboration, and increases visibility and access to these activities and partnerships for OCS leadership.

Department of Homeland Security - U.S. Coast Guard

Location: Washington, DC

Embedded Liaison: CAPT Jeremy Adams, NOAA Commissioned Officer Corps
As the NOAA liaison to the United States Coast Guard (USCG), CAPT Adams maintains a current and comprehensive knowledge of interagency activities and policies related to the USCG and NOAA. He identifies potential conflicts or benefits issues for analysis and evaluation, conducts appropriate assessments and studies, and serves as the interface between NOAA and the USCG. CAPT Adams initiates, designs, and implements strategies through federal agency liaison and coordination that results in cooperative arrangements for maritime security, oceanographic research, hazardous materials spill response, and many other activities.



Teacher At Sea Program



The mission of the Teacher at Sea (TAS) program is to give teachers a clearer insight into our ocean planet, a greater understanding of maritime work and studies, and to increase their level of environmental literacy by fostering an interdisciplinary research experience. The program provides a unique environment for learning and teaching by sending kindergarten through college-level teachers to sea aboard NOAA research and survey ships to work under the tutelage of scientists and crew. Then, armed with new understanding and experience, teachers bring this knowledge back to their classrooms. Since its inception in 1990, the program has enabled more than 600 teachers to gain first-hand experience of science and life at sea. By participating in this program, teachers enrich their classroom curricula with knowledge that can only be gained by living and working side-by-side, day and night, with those who contribute to the world's body of oceanic and atmospheric scientific knowledge. Below is a list of the NOAA Teachers at Sea activities for the current month. Once the 2015 teachers at sea sailing projects have started, you can gain access to their blogs which document their missions at sea and offer a wealth of information about the research being conducted as well as personal stories. More info:

<http://teacheratsea.noaa.gov>

2014 TAS Placements Blogs – <http://teacheratsea.noaa.gov/2014/index.html>

2014 NOAA Teacher at Sea Year in Review Report - <http://teacheratsea.noaa.gov/about/highlights.html>

February 6, 2015 – Two shark scientists from NOAA's National Marine Fisheries Service, Southeast Fisheries Science Center will visit Julie Karre's (TAS, 2013) school in Baltimore, MD.

February 7, 2015 – NOAA Heritage Day Open House; Jenny Goldner (TAS, 2011), Dr. William Driggers and Kristin Hannan from NOAA's National Marine Fisheries Service, Southeast Fisheries Science Center will give a presentation and have hands-on activities in Silver Spring, MD.

February 11-12, 2015 – International Teacher Scientist Partnership Conference in San Francisco, CA; Three TAS staff will present and Stacey Klimkosky (TAS 2009) will present with Grace Simpkins, science educator from NOAA's National Marine Fisheries Service, Northeast Fisheries Science Center.

March 2015 – Looking to start the season and begin sailing teachers.



OMAO - NOAA Dive Program



OMAO manages and implements NOAA's Dive Program (NDP), which trains and certifies scientists, engineers, and technicians from federal, state, tribal governments, and the private sector to perform the variety of tasks carried out underwater to support NOAA's mission. NDP also has cooperative diving agreements with over 100 government agencies and academic institutions. NOAA has more than 400 divers who perform over 14,000 dives per year. The NDP is headquartered at the NOAA Diving Center at the NOAA Western Regional Center in Seattle, Washington. http://www.ndc.noaa.gov/gi_program.html.



Most NOAA ships have NOAA Corps divers on board that provide essential services in support of research projects and to conduct ship maintenance. Ship hull inspections, hull cleanings and maintenance provided by the divers save the [NOAA Office of Marine and Aviation Operations](#) tens of thousands of dollars per ship every year.

Shown above, a ship's diver from [NOAA Ship Oscar Elton Sette](#) uses a pneumatic wheel grinder to clean the ship's propellers during a maintenance dive.

[Photo: LT Ryan Wattam, NOAA]



OMAO - NOAA Small Boat Program



OMAO sets policy and provides safety inspections for almost 400 small boats operated by the various Line and program offices throughout NOAA, which support fisheries laboratories, dive support, nautical charting, ocean and Great Lakes research, and more. More info: <http://www.sbp.noaa.gov/>



NOAA small boats support many diverse operations across the country.

[Photos: NOAA]



Office of Marine and Aviation Operations



Providing environmental intelligence for a dynamic world

The personnel, ships, and aircraft of NOAA play a critical role in gathering environmental data vital to the nation's economic security, the safety of its citizens, and the understanding, protection, and management of our natural resources. The NOAA fleet of ships and aircraft is managed and operated by the Office of Marine and Aviation Operations (OMAO), an office comprising civilians, mariners, and officers of the NOAA Commissioned Officer Corps, one of the seven uniformed services of the United States. NOAA's roots trace back to 1807, when President Thomas Jefferson ordered the first comprehensive coastal surveys. Those early surveys ensured safe passage of ship-borne cargo for a young nation. As the needs of the nation have grown, so too have OMAO's responsibilities. Today, OMAO civilians and NOAA Corps officers operate, manage, and maintain NOAA's active fleet of 16 research and survey ships and nine specialized aircraft. Together, OMAO and the NOAA Corps support nearly all of NOAA's missions.

NOAA has the largest fleet of federal research and survey ships in the nation. The fleet ranges from large oceanographic ships capable of exploring and charting the world's deepest ocean, to smaller vessels responsible for surveying the shallow bays and inlets of the United States. The fleet supports a wide range of marine activities including fisheries surveys, nautical charting, and ocean and climate studies. Based throughout the continental United States, Alaska, and Hawaii, the ships operate in all regions of the nation and around the world.

NOAA's aircraft provide a wide range of airborne capabilities. Our highly specialized Lockheed WP-3D "Hurricane Hunter" aircraft are equipped with an unprecedented variety of scientific instrumentation, radars, and recording systems for both in situ and remote sensing measurements of the atmosphere, the Earth, and its environment. Equipped with both C-band weather radar and X-band tail Doppler radar systems, the WP-3Ds have the unique ability to conduct tropical cyclone research in addition to storm reconnaissance. Together with NOAA's Gulfstream IV-SP hurricane surveillance jet, these aircraft greatly improve our physical understanding of hurricanes and enhance the accuracy of tropical cyclone forecasts. NOAA's light aircraft also play a vital role in monitoring our environment. Our King Air, Commander and Twin Otter aircraft support marine mammal population studies, shoreline change assessments, oil spill investigations, and water resource/snowpack surveys for spring flood forecasts.

The NOAA fleet provides immediate response capabilities for unpredictable events. For example, in November 2014, our aircraft flew missions over upstate New York after the record snow falls of up to seven feet and conducted airborne Snow Water Equivalent (SWE) and soil moisture measurements. Airborne SWE measurements are used by NOAA's National Weather Service when issuing river and flood forecasts, water supply forecasts, and spring flood outlooks.

After Hurricane Sandy in 2012, NOAA ships *Thomas Jefferson* and *Ferdinand R. Hassler* conducted emergency bathymetric surveys to locate possible submerged navigational hazards in the ports of New York and Virginia. These surveys enabled the ports to reopen quickly. Aerial images of storm-stricken regions, taken by NOAA aircraft, helped residents and emergency workers to quickly assess the condition of houses, bridges, and vital infrastructure. In 2010, the NOAA fleet and the NOAA Corps played a major role in the response to the BP Deepwater Horizon oil spill. NOAA's entire Atlantic fleet and over a quarter of the total strength of the NOAA Corps were deployed to the Gulf following the spill, developing mission plans and assisting response efforts.

While manned aircraft and sea-going vessels have been, and will continue to be, a primary source of environmental data, new technology will have a significant role to play in the future NOAA fleet. OMAO, in coordination with other NOAA offices and federal agencies, is evaluating and deploying remotely piloted underwater and aircraft systems that could significantly contribute to environmental observations. OMAO's ongoing challenge is to meet the growing demand for *in situ* scientific data while providing the highest level of service. To better serve the needs of the nation, NOAA is examining the composition of the fleet through an exhaustive and critical review of at-sea science and observation requirements. Our objective is to develop a clear, cost-efficient path forward to ensure that the NOAA fleet can continue to conduct at-sea surveys and research vital to fisheries management, updating nautical charts, responding to natural and manmade disasters, and understanding coastal and marine systems more fully. Meeting these requirements is essential to developing sustainable, science-based management and conservation plans that protect the health and resiliency of these resources over the long-term.

We continue our efforts to build a civilian and NOAA Corps officer work force that is uniquely qualified to gather critical environmental intelligence and be adaptive and responsive to a changing world and work to expand our partnerships with other federal agencies. For example, NOAA Corps officers are currently assigned to work in the Department of Defense, National Science Foundation, and the U.S. Senate among others where they lend their expertise and service. We also continue to strengthen our partnership with the U.S. Coast Guard. Our basic NOAA Corps officer training class is held at the U.S. Coast Guard Academy, where newly commissioned officers train alongside Coast Guard officer candidates, developing skills and professional relationships that will benefit both services, especially during challenging times. Active collaboration among the Federal family is critical to ensuring the long-term capability and success of the federal ocean infrastructure. Our partners' success is our success. The men and women of OMAO and the NOAA Corps provide environmental intelligence for a dynamic world as they serve our nation every day from the farthest seas to the highest skies.



NOAA Commissioned Officer Corps



– Supporting NOAA's Science, Service, and Stewardship –

The NOAA Commissioned Officer Corps (NOAA Corps) is one of the nation's seven uniformed services and serve with the 'special trust and confidence' of the President. NOAA Corps officers are an integral part of the National Oceanic and Atmospheric Administration (NOAA), an agency of the U.S. Department of Commerce. With 321 officers, the NOAA Corps serves throughout the agency's line and staff offices to support nearly all of NOAA's programs and missions. The combination of commissioned service and scientific expertise makes these officers uniquely capable of leading some of NOAA's most important initiatives.

The NOAA Corps is part of NOAA's Office of Marine and Aviation Operations (OMAO) and traces its roots back to the former U.S. Coast and Geodetic Survey, which dates back to 1807 and President Thomas Jefferson. In 1970, NOAA was created to develop a coordinated approach to oceanographic and atmospheric research and subsequent legislation converted the commissioned officer corps to the NOAA Corps.

The NOAA Corps today provides a cadre of professionals trained in engineering, earth sciences, oceanography, meteorology, fisheries science, and other related disciplines. Corps officers operate NOAA's ships, fly aircraft, manage research projects, conduct diving operations, and serve in staff positions throughout NOAA.

Benefits of the NOAA Corps to the Nation

The combination of commissioned service with scientific and operational expertise, allows the NOAA Corps to provide a unique and indispensable service to the nation. NOAA Corps officers enable NOAA to fulfill mission requirements, meet changing environmental concerns, take advantage of emerging technologies, and serve as environmental first responders. For example:

- In 2012 after Hurricane Sandy, seafloor sonar surveys completed by NOAA ships and small boats helped reopen Baltimore and Virginia ports, quickly restarting commerce and allowing Navy ships to return to port. New York and New Jersey ports were reopened, enabling emergency supplies to reach some of the hardest-hit areas. Maritime traffic resumed more quickly because NOAA embedded regional navigation managers within command centers.
- Hours after Sandy, NOAA planes and scientists conducted aerial surveys of the affected coastlines and immediately published the photos online, allowing emergency managers and residents to examine the damage even before ground inspections were permitted. These surveys are also vital to FEMA assessment teams and other on-the-ground responders and those managing oil spill clean-up and damage assessment. Over 3,000 miles of coastline have been surveyed, and over 10,000 images processed to document coastal damage and impacts to navigation.
- In 2011, OMAO's Aero Commander and Jetprop Commander aircraft conducted snow surveys, which increased the accuracy of National Weather Service's River Forecast Centers flood forecasting during a record year of snow and floods.
- After Hurricane Irene in 2011, the NOAA Ship *Ferdinand Hassler* and team completed 300 lineal nautical miles of survey work in less than 48 hours providing a Damage Assessment that enabled the

U.S. Coast Guard to re-open ports and restore more than \$5M per hour in maritime commerce less than 3 days after the storm.

- More than 80 officers, or a quarter of the NOAA Corps' total strength, were re-assigned and/or deployed to support the Deepwater Horizon disaster response in the Gulf in 2010.
 - Eight NOAA-owned vessels, or the entire Atlantic fleet, were also deployed to the Gulf of Mexico for spill response, as well as several aircraft.
- NOAA Corps officers who run NOAA's Ships support fish stock and marine mammal assessments, marine ecosystem studies, ocean exploration, coral reef preservation and protection, and mapping and charting around the United States and the Arctic, and more.
- NOAA Corps officers who run NOAA's Aircraft collect environmental and geographic data essential to studying climate change, assess marine mammal populations, survey coastal erosion, investigate oil spills, and improve hurricane and winter storm forecasts as they pilot the WP-3D Orion hurricane hunters and other aircraft that fly through, and above the storms to obtain critical forecasting data.

Find out more about the NOAA Corps, its mission and history at <http://www.noaacorps.noaa.gov/>.



NOAA officer candidates heaving on a line aboard the U.S. Coast Guard Cutter EAGLE during their basic officer training at the Coast Guard Academy.

[Photo: NOAA]